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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,388	07/17/2003	Hajime Ikuno	240441US0	9623

22850 7590 07/11/2007
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

MORILLO, JANEL COMBS

ART UNIT	PAPER NUMBER
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1742

NOTIFICATION DATE	DELIVERY MODE
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07/11/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary

Application No.

10/620,388

Applicant(s)

IKUNO ET AL.

Examiner

Janelle Combs-Morillo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,6,11-15,19,20,24-26,30,31,35 and 36 is/are pending in the application.
- 4a) Of the above claim(s) 11-14,20,24 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,15,19,26,30,31,35 and 36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 18, 2007 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5, 6, 15, 19, 26, 30, 31, 35, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over RU 2092604C1 (RU'604) and "Aluminum Standards and data 2003" p 1-6.

RU'604 teaches an aluminum based alloy with 11-25% Si (substantially overlapping the Al-Si hypereutectic range), 1-4.5% Cu, 0.05-2% Ni, 0.1-2% Fe, 0.05-1% Mg, 0.1-2% Mn, 0.01-0.4% Ti, 0.005-0.5% V, 0.01-0.3% Zr (abstract), which overlaps the presently claimed alloying ranges. RU'604 teaches that said alloy has increased strength and elongation (abstract, examples) and can formed into products by casting. It is held to be within the scope of RU'604 to cast a variety of products/ configurations, including a piston, because RU'604 teaches said alloy can be cast into high strength parts (abstract).

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Concerning the instant ranges of P and Ca, "Aluminum Standards and data 2003" p 1-6 teaches Na, Sr, Ca, and/or P are added to 3xx and 4xx type Al-Si foundry alloys in order to modify the structure. "Aluminum Standards and data 2003" teaches 0.005-0.15% Ca and \leq 0.060% P are effective modifiers. Though the minimum of 0.005%Ca taught by "Aluminum Standards and data 2003" does not fall within the presently claimed range of 0.0005-0.003% Ca, 0.005% is held to be a close approximation of 0.003%. It would have been obvious to one of ordinary skill in the art to use Ca and P as modifiers for the Al-Si alloy taught by RU'604, because "Aluminum Standards and data 2003" teaches Ca and P are effective modifiers for 3xx series Al-Si alloys.

A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985), see MPEP 2144.05.

Because the prior art of RU'604 combined with "Aluminum Standards and data 2003" teach a modified Al-Si hypereutectic alloy with overlapping (or close approximation) of the presently claimed alloying ranges, it is held that RU'604 combined with "Aluminum Standards and data 2003" have created a prima facie case of obviousness of the presently claimed invention. Overlapping ranges have been held to be a prima facie case of obviousness, see MPEP § 2144.05. It would have been obvious to one of ordinary skill in the art to select any portion of the range, including the claimed range, from the broader range disclosed in the prior art, because the prior art finds that said composition in the entire disclosed range has a suitable utility.

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Concerning claims 5, 15, 35, which mention the “pre-use” Vickers hardness, RU’604 teaches said alloy has excellent strength and hardness (see Table 2, 3). Though RU’604 does not mention the hardness of said alloy, where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). Because the prior art teaches a substantially overlapping alloy composition, wherein said alloy is processed in a similar method of casting, the properties applicant discloses and/or claims (such as Vickers hardness) are expected to be present. See MPEP 2112.01.

Concerning claims 6, 19, 30, 36, which mention “wherein size of non-metal inclusion existing within the piston is less than 100 μm ”, because the alloy taught by RU’604 is substantially overlaps the presently claimed alloy composition (as well as being processed by a similar method of casting and heat treating), then substantially the same non-metal inclusions are expected to be present (see discussion above). Additionally, the examiner points out that said claims are not drawn to *all* inclusions, or *an average*, etc., but said limitation is met by one non-metal inclusion being $\leq 100 \mu\text{m}$.

Response to Amendment

4. In the response filed on April 18, 2007 and April 9, 2007, applicant submitted various arguments traversing the rejections of record, and a 1.132 declaration.
5. The declaration under 37 CFR 1.132 filed April 9, 2007 is insufficient to overcome the rejection of claims 1,5,6,15,19,26,30,31,35,36 based upon RU’604 and “Aluminum Standards

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and data 2003” as set forth in the last Office action because: said declaration shows that alloys of the invention with calcium of 0.0005% and 0.003% exhibit fine structure but haven’t clearly shown criticality of the presently claimed range. Evidence of unexpected properties may be in the form of a direct or indirect comparison of the claimed invention with the closest prior art which is commensurate in scope with the claims. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and MPEP §716.02(d) - § 716.02(e). To establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960).

6. Additionally, as set forth in the advisory action paper no. 012907, Applicant’s argument that criticality of the presently claimed Ca range has been established (examples in the original specification) has been found partially persuasive. The examiner points out that the instant claims are drawn to low Mg embodiment (independent claims 1, 31) and medium Mg embodiment (independent claims 15, 26). Issue a: the examiner agrees that Fig. 5 and 6 show the claimed min. Ca is critical and obtains superior results to Fig. 7 and 8 (too low Ca), for a low Mg embodiment of the instant invention- see discussion of Table 9 and said Figures in the instant specification (the ex. in Table 9, A1, A2, A3, A4 are drawn to a low Mg embodiment). Issue b: the examiner agrees that Fig. 9 shows the claimed max. of Ca is critical to obtaining a fine homogeneous structure for a medium Mg embodiment (see Fig. 9, 10, 11, Table 10 etc), wherein said med. Mg embodiment of cl. 15, 26. Applicant has not clearly shown the criticality of Ca range (that is, both min. and max. of Ca) with respect to the presently claimed invention (either low or medium Mg embodiments).

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Said unexpected results are not commensurate in scope with the claimed invention (see MPEP 716.02 d). Whether the unexpected results are the result of unexpectedly improved results or a property not taught by the prior art, the "objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support." In other words, the showing of unexpected results must be reviewed to see if the results occur over the entire claimed range. *In re Clemens*, 622 F.2d 1029, 1036, 206 USPQ 289, 296 (CCPA 1980).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Combs-Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 8:30 am- 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

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A handwritten signature in black ink, appearing to be 'JCM', written over the printed name 'JCM'.

JCM

July 2, 2007